A Different Rationale for Redistribution: Pursuit of Happiness in the European Union

John Cullis, John Hudson and Philip Jones

No. 10/09

BATH ECONOMICS RESEARCH PAPERS

Department of Economics and International Development

A Different Rationale for Redistribution:

Pursuit of Happiness in the European Union[1]

John Cullis, John Hudson and Philip Jones*

University of Bath, U.K.

ABSTRACT

This paper explores the importance of the determinants of happiness when assessing the case for international redistribution. It presents a different rationale for international redistribution with reference to the impact that absolute levels of income and relative levels of income exert on happiness. The case for redistribution is so strong that it exists even when citizens are envious of one another and malevolent toward one another. The importance of these two determinants of happiness is explored when assessing the case for redistribution between member states of the European Union. An analysis of the importance of these determinants in the European Union reveals that there is significant scope for further redistribution to increase happiness. An index of happiness is constructed and simulations are presented to shed insight into the role that governments might play in the pursuit of happiness.

* The authors are Reader in Economics and Professors of Economics respectively in the Department of Economics and International Development at the University of Bath, UK.

[1] We wish to acknowledge the helpful comments of the managing editor and also three anonymous referees which have substantially improved the paper.

A Different Rationale for Redistribution:

Pursuit of Happiness in the European Union[2]

1. Introduction

Beveridge (1942) stated that: "The object of government in peace and in war is not the glory of rulers or of races, but the happiness of the common man".[3] As Director of the London School of Economics he was the author of the report that inspired the extension of the UK welfare state and his prescription that government should focus on happiness is even more pertinent today with insight provided by a growing empirical literature on the determinants of happiness. The objective in this paper is to focus on some of the more robust findings in this literature (reviewed by Frey and Stutzer 2002a, 2002b) and to demonstrate how they might be used to inform policy designed to increase 'the happiness of the common man'.

One of the most robust results is that "… it is not the absolute level of income that matters most but rather one's position relative to other individuals" (Frey and Stutzer 2005:124). This finding has already informed policy proposals. Frank (1997) and Layard (1980) argue that it implies that individuals spend '…too much' time in income-earning activity (to acquire the resources necessary to finance 'conspicuous consumption'). They prescribe tax policy to correct the market failure that arises when individuals are locked in a counterproductive 'acquisition race'. They advocate tax

[2] We wish to acknowledge the helpful comments of the managing editor and also three anonymous referees which have substantially improved the paper.

[3] An echo (22/5/06) of the sentiment has come from David Cameron, leader of the opposition Conservative Party in the UK, who stated: "It's time we admitted that there's more to life than money, and it's time we focused not just on GDP, but on GWB – general well-being." The pursuit of happiness may be an idea whose time has come.

policy to reduce individuals' incentive to expend effort on the acquisition of ever larger houses and ever more powerful motor cars.

This paper focuses on the same empirical finding and on the observation that relative income and absolute income have a different impact on happiness at different stages of economic development. Above an absolute level of income per capita the relevance of absolute income as a determinant of happiness diminishes (Frey and Stutzer 2002b refer to an income of US$10,000 in 1995). One implication of these findings is that tax policy can be designed to correct market failure in high-income countries and redistribute revenue to individuals in low- income countries so that everyone's happiness increases.

The first section of the paper responds to Layard's (2006) call for more theoretical analysis of the implications of these empirical results. The objective is to emphasise the relevance of these empirical findings for the likelihood that redistribution will increase happiness. When these findings apply, a rationale for redistribution can be premised on malevolence (rather than benevolence). Policy can be designed to redistribute income and the happiness of the common man increases even if the common man has no interest in the well-being of the recipients of this redistribution.

Later sections of the paper focus on the relevance of the same empirical findings when exploring the impact of redistribution on happiness. If the empirical findings are so potent that they justify redistribution when individuals do not care about the recipients of redistribution, surely they are relevant when exploring the potency of redistribution more generally? Later sections of the paper focus on a case study. If,

within the European Union (EU), "…the aim of public policy should be to maximise people's happiness suitably aggregated" (Layard 2005:147) what impact do these same empirical findings exert on the possibility that all may be made happier as a consequence of redistribution? What influence do they exert in simulations of the impact of redistribution on happiness in the EU?

2. Can redistribution increase everyone's happiness if individuals are malevolent?

The objective in this section is to highlight the significance of recent findings in the empirical literature by demonstrating that everyone might be made better off if income is redistributed even if no one is motivated to act philanthropically. The relevant empirical findings are that happiness is an increasing function of absolute and relative income but that relative income assumes greater importance at high levels of per capita income (Frey and Stutzer 2002b). These results are important when analysts explain why happiness indices do not show a clear upward trend over time despite steady increases in living standards (Blanchflower and Oswald, 2004a). In this section of the paper they are important when considering a quite different rationale for redistribution.

The following analysis adapts earlier work by Brennan (1973) by including empirical findings concerning the importance of relative and absolute levels of income. Figure 1 has been constructed to illustrate the impact of income on the happiness of individuals A and B (who are citizens of a high-income country). The income levels of two individuals A and B (assumed to have identical preferences) are recorded as Y_A and

Y_B in Figure 1 (quadrant I). Their income level is connected to self-reported happiness[4] (H) in Figure 1 (quadrant IV). If happiness depended only on absolute levels of income, A would prefer to be at point 1 in quadrant (I) to maximise happiness at point 1" in quadrant (IV). If A were at point 1 in quadrant (I) self-reported happiness would be h* (for A would be at point 1'' on H_i). As A and B are identical the analysis is symmetrical around the 45° line (point 1' has the identical properties for individual B to point 1 for individual A).

Insert Figure 1 about here.

The analysis changes if happiness also depends on relative income. The well being of individual A depends negatively on the income of individual B and vice versa. Citizens are envious and malevolent. The incentive (dominant strategy) is for both individuals to expend further effort in an 'income race'. The Cournot-Nash reaction curves R_A and R_B describe how this race unfolds (as it documents the utility-maximising reaction of each individual to the increased income of the other). The equilibrium found is the Nash non-cooperative one at point 2, where both A and B have incomes y_2 and self-reported happiness level at point 2' in Figure 1 (quadrant IV), namely, h_1. This is read from the relation H_l, where it is assumed that both individuals are constrained to have identical incomes and hence H_l is drawn lower in self-reported happiness terms than H_i to reflect this.

Point 2 puts individual A on indifference curve I^A_2 and individual B on indifference curve I^B_2. These two curves contain an ellipse of Pareto-superior outcomes to point 2.

[4] Which equates to actual happiness.

These points are superior but paradoxically involve lower retained income. The contract or, more aptly in this case, conflict curve (Boulding's terminology e.g. 1955) runs North West- South East from point 1' to point 1 and a 'Nash bargaining-solution', based on fairness,[5] would produce point 3 as the equilibrium. This will put individual A on indifference curve I^A_1 and individual B on indifference curve I^B_1 (indifference curves are labelled to indicate that the higher-numbered indifference curves are further away from bliss point, in this case from point 3)

Layard (1980) argues that an income tax might resolve this problem and Frank (1997) calls for a progressive consumption tax. In this paper analysis also considers the way that tax revenue might be used. Figure 1 is designed to show how tax revenue might be redistributed internationally to increase happiness. In Figure 1 the 'market failure' problem in the high income country is solved by taxation so that there is revenue to redistribute to a third, poorer, party[6]. Revenue is redistributed to individual C. Individual C is a citizen in a low-income country. With low income, C is not a member of A and B's peer group (in this way C's income is a 'neutral good' as far as A and B are concerned).

C's initial income is y_1^C (illustrated as one twelfth of y_2) in Figure 1 (quadrant III) and self-reported happiness level is h_0^C. If both individuals A and B transfer $y_1 - y_2$ to

[5] This of course is an Hamada type construction which is drawn here such that reneging to respective reaction functions puts A and B on lower indifference curves than those associated with point 2 (so the threat to 'not cooperate' if one party tries to renege should be sufficient to secure compliance in the small numbers case). The bargain to this extent is self-enforcing. However generally, when numbers are large, free riding and a case for government redistribution can be predicted.

[6] There is evidence that the taxation system can be used in this way. Rogerson (2008), for example, argues that relative increases in taxes in Europe can explain much of the 45 percent decline in hours worked relative to the United States over the period 1956 to 2003. Moreover, and this is important, the elasticities are such that an increase in tax rates does tend to raise tax revenue[6].

individual C, then the ray 0' – r in Figure 1 (quadrant II) (with angle 26.56°) shows how income is raised for individual C to y_2^c. Research suggests the short and long run impact of this transfer will differ. With reference to Figure 1 (quadrant III) increasing short-run (unhabituated) happiness[7] increases to point 4 on H_s (conditioned on y_1^c as the initial income level) with happiness level h_1^c . This will later fall back to h_2^c on H_l at point 4' as individual C becomes habituated to income level y_2^c. Empirically this suggests a short run estimated impact that exceeds the long run one. The donors increase their happiness to point 3' on H_l in Figure 1 (quadrant IV), with the self reported happiness level h_2. Note C does not become as well off as A and B. As illustrated $2\ y_2^c = y_2$. For presentation purposes it is assumed that A and B are unconcerned with C as long as C does not have an income gross of transfers in excess of a given threshold.

Figure 1 shows that happiness increases in the donor country and in the recipient country. However the rationale for redistribution depends on the envy that citizens in the high-income country have for each others' income. When Booth (2007:9) surveys the empirical literature on the determinants of happiness he comments (almost 'tongue in cheek') that "…policymakers have latched on to the apparent need to have a more even distribution of income to raise national happiness- something that many would regard as the legitimisation of envy…". Here the analysis serves to legitimise envy as a rationale for redistribution. The important observation is that it is premised on the robust findings that both relative income and absolute levels of income are important determinants of happiness at different stages of economic development.

[7] In the constructions $dHs/dY > dHl/dY$ conditional on an inherited income level, say, y_1^c initial income in Figure 1 (quadrant III) and generally it is assumed $dH/dY > 0$ with $d^2H/dY^2 < 0$.

3. Happiness in the European Union: A Case Study

Section two of the paper focused on malevolence to emphasise the significance of the determinants of happiness as reported in a growing empirical literature. In this section the objective, more generally, is to consider the importance of these same variables when considering policy to increase happiness in the EU. As empirical relationships reported by empiricists are relevant when explaining the scope for redistributions, the objective is to focus on their importance when simulating the impact of redistribution on happiness in the EU.

The analysis in section two of the paper was premised on the assumption that relative income and absolute income are important determinants of happiness and that the significance of absolute income falls as income per capita increases. This situation is consistent with the observation that absolute levels of income have a non-linear impact on happiness as income increases but relative income has a linear impact on happiness as income per capita increases. (Indeed, if the impact of relative income on wellbeing *were* driven by envy there would be no reason to suppose that this impact would lessen as income per capita increased). Of course the impact of absolute levels of income is likely to decline as income per capita increase because standard utility theory suggests that marginal utility diminishes as living standards increase. The first objective in this section of the paper is to explore the possibility that these relationships are relevant when explaining happiness in the EU.

Before commencing on the empirical work it is important to acknowledge the criticism that might be made of such an approach. Critics have argued that it is difficult to rely on cardinal data on satisfaction but as Di Tella et al (2001) argue, such cardinal data does not behave so erratically and the welfare functions they imply are intuitive. Second, there is evidence that individuals in a 'language community' have a common understanding of how to translate internal feelings into a number scale (Van Praag, 1991) and here the objective is to compare citizens in different 'language communities'. Once again, it is important to acknowledge this criticism but there is also evidence that individuals are able to recognize and predict satisfaction levels (in terms of happy, sad, jealous, etc.) of people from other cultural communities (Diener and Lucas, 1999). While it is important to recognise the difficulties of the approach that is to be pursed it is also important to stress that the following exercise makes comparisons between 'representative' individuals (i.e. not between two specific individuals, but representative of those in society as a whole).

Notwithstanding these qualifications, how relevant are absolute levels of income and relative levels of income when explaining happiness and what insight do these relationships shed when simulating the impact of redistribution in the EU?

3.1 Estimates of the Determinants of Happiness in the European Union

The data employed are derived from the Eurobarometer survey carried out in April/May 2001 of the EU member countries and a second Eurobarometer survey[8] carried out in November/December 1999. These years were chosen as they provide a full data set on age, income, satisfaction and the other explanatory variables. This does not tend to be the case in more recent surveys, where income is often not given in as much detail as in these two surveys. The surveys cover the population of the respective nationalities of the EU member states aged fifteen years and over in each of the member states. The 2001 survey was carried out by INRA (EUROPE), a European Network of Market and Public Opinion Research agencies, and GIK Worldwide on request of the European Commission. The basic sample design is a multi stage, random probability one. The surveys are designed to be representative in terms of the distribution of the resident population of the respective EU nationalities in terms of metropolitan, urban and rural areas. All interviews were face to face, in people's homes and in the appropriate national language. The data collected from the earlier Eurobarometer survey was based on a similar sample design and was collected by INRA(EUROPE).

The dependent variable represents responses to the question:

> "On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead? Would you say you are……?"

[8] Eurobarometer data has been widely used in attitudinal research, including that related to subjective well being (e.g. Bjornskov, Gupta and Pedersen, 2008) .

where possible responses were: (i) very satisfied (coded 4 in our analysis), (ii) fairly satisfied, (iii) not very satisfied and (iv) not at all satisfied (coded 1).[9] A fifth possibility was "don't know".

The responses are ordinal and ordered probit is used to estimate the data. The regression analysis excludes don't knows and, of course, those who otherwise did not answer the question.[10] Income was based on an income range relating to monthly household income, including state benefits before tax and other deductions. Absolute income was found by taking the midpoint of the income range as an indicator of the individual's income.[11]

The data relating to satisfaction is summarized in Table 1. There are wide variations between countries; in general, the richer countries are more satisfied than the poorer countries. It is also evident that there has been a general downward shift comparing the two years with the sole exception of the Netherlands.

[9] The potential problems with this measure (including the econometrics problems posed by measurement errors) are discussed in Frey and Stutzer (2002a). They conclude that the problems are reduced when they are used to estimate the relative determinants of happiness.

[10] This type of question has been used before in empirical work on well-being and happiness and in particular the Eurobarometer series has been used by (for example) Di Tella, MacCulloch and Oswald (2001). The analysis involves the assumption that we can imply a cardinal interpretation to the subjective, qualitative responses to the question proxying well-being.

[11] This is not unusual in this type of analysis, indeed any research which uses Eurobarometer data e.g. has to make similar calculations. It would be better to have more exact measures of income as in the European Community Household Panel (ECHP), but this is not available and the ECHP, e.g., does not have data on wellbeing per se, but rather wellbeing relating specifically to work, finance, housing and lesiure.

Table 1: Country Scores on Happiness

	2001	1999		2001	1999
Austria	2.09	2.33	Italy	1.92	2.03
Belgium	2.06	2.12	Luxembourg	2.29	2.40
Denmark	2.58	2.75	Netherlands	2.42	2.41
Finland	2.11	2.24	Portugal	1.63	1.74
France	1.91	2.04	Spain	2.02	2.05
Germany	1.90	2.04	Sweden	2.37	2.42
Greece	1.50	1.98	UK	2.20	2.25
Ireland	2.22	2.30			

Source: Data derived from Eurobarometer Surveys in 1999 and 2001. The 'score' is the mean when the happiness question defined in the appendix is coded zero for not at all satisfied, one for not very satisfied, etc. Hence a score of 2 corresponds to an average response of 'fairly satisfied'.

Existing research already sheds insight on variables that are likely to prove significant. These are:

i) relative income;

ii) GDP per capita in the different member countries;

iii) age;

iv) gender;

v) education; [12]

vi) dummy variables for those unemployed and those where the primary earner in the household (if other than the respondent) is unemployed;

vii) dummy variables representing marital state; [13]

viii) variables which reflect overall improvements in life. [14]

[12] The education level was included in log form to allow for possible non-linearities.

[13] One for those who are divorced, one for those separated from a partner who they were not married to, one for those widowed, and one for those who are alone and have never lived with a partner or been married. The default case is therefore "married".

[14] The first asks about whether the respondents “situation” has improved or worsened over the last five years (two years in the 1999 survey) and the second asks about expectations relating to the future over the same time horizon as the retrospective question.

Absolute income is measured at the midpoint of the income range (as an indicator of an individuals' income); relative income is the ratio of this to the average. GDP per capita refers to the country in which a respondent is resident in the same year as the survey. [15] Variables are defined in the Appendix.

The assumption is made that there is an underlying response variable W_i, measuring life well-being along a continuum, and linked to the individual's socio-economic and country characteristics ($\mathbf{X_i}$):

$$W_i = g(\mathbf{X_i}) \qquad (1)$$

Satisfaction or happiness (Y^*_i) is a function of well-being relative to some aspiration level W_i^a:

$$Y^*_i = h(W_i - W_i^a) = f(\mathbf{X_i}) + u_i \qquad (2)$$

W_i^a itself may be a function of the individual's socio-economic characteristics and particularly from country to country may depend upon GDP per capita and also relative income.[16] $f(\mathbf{X_i})$ encapsulates this combined relationship. These points are returned to below. The socio-economic variables impact on well being through equation (1). Satisfaction is then based on a comparison of well being and aspirations via equation (2). The direct impact of an increase in the socio-economic variables is to

[15] The figures, which are taken from World Development Indicators, are in US$10,000 adjusted for purchasing power parity. As with relative income the results are robust with respect to other specifications for GDP per capita.
[16] Easterlin (2001) suggests that over the life cycle aspirations will grow with income.

raise well being and it is through the impact of this on satisfaction that people perceive an increase in satisfaction.

The i'th individual's response to the question will depend on the value of Y_i^*. The survey data has m possible responses corresponding to m+1 extended real numbers, $\alpha_0, \alpha_1, \ldots, \alpha_m$. Defining $\alpha_0 = -\infty$ and $\alpha_m = +\infty$ and $\alpha_j > \alpha_{j-1}\ \forall j$ the individual will respond in the j'th category if:

$$\alpha_{j-1} < Y^*_i < \alpha_j \qquad (3)$$

Personality factors may enter in one of three ways. First in intervening between the socio-economic characteristics and well-being, second in the formulation of an aspirational level and third in h(.) the function transforming the individual's relative well-being into satisfaction or happiness.[17] Because the data is ordered it is natural to use ordered probit to estimate $f(\mathbf{X_i})$. The regression estimates are also clustered at country level to take account of intra-group correlation.

[17] Strictly speaking only the third possibility unambiguously results in different functional forms for different individuals. This possibility is deserving of further analysis with a data set which includes information on 'personality'.

Table 2: Cross Section Results: All Countries

	2001 Data Base			1999 Data Base			Pooled Data Base			
Equation	(2.1)	(2.2)	(2.3)	(2.4)	(2.5)	(2.6)	(2.7)	(2.8)	(2.9)	(2.10)
Gender	0.0679*	0.0593*	0.1158**	0.0286	0.0213	0.0495	0.0494*	0.0417*	0.0834**	0.0295
	(2.27)	(2.00)	(3.98)	(1.05)	(0.87)	(1.92)	(1.99)	(1.98)	(3.83)	(1.31)
Age	-0.0199**	-0.0175*	-0.0288*	-0.0314**	-0.0244**	-0.0199*	-0.0254**	-0.0211**	-0.0231*	-0.0130*
	(3.18)	(2.54)	(2.30)	(5.11)	(4.65)	(2.40)	(4.62)	(4.12)	(2.50)	(2.41)
Age^2	0.00028**	0.00027**	0.00040**	0.00033**	0.00028**	0.00020	0.00030**	0.00027**	0.00029**	0.00019**
	(4.42)	(3.65)	(2.86)	(5.41)	(5.00)	(1.94)	(5.64)	(4.99)	(2.63)	(3.15)
Life Improved	0.5946**	0.6171**	0.6384**	0.3153**	0.3343**	0.3248**	0.4619**	0.4807**	0.4844**	0.4786**
	(12.34)	(12.96)	(12.40)	(11.76)	(12.58)	(10.58)	(16.78)	(17.58)	(15.26)	(17.45)
Will Improve	0.0777	0.0966*	0.0618	0.0537	0.0574	0.0313	0.0795	0.087	0.059	0.0857
	(1.93)	(1.96)	(1.18)	(1.26)	(0.92)	(0.43)	(1.70)	(1.50)	(0.92)	(1.50)
Always single	-0.0798	-0.1063	-0.1199	-0.0952**	-0.1452**	-0.1327**	-0.0926**	-0.1281**	-0.1279**	-0.1113**
	(1.44)	(1.70)	(1.81)	(2.66)	(3.25)	(3.23)	(2.96)	(3.00)	(3.03)	(2.83)
Single after	-0.2598**	-0.2449**	-0.2326**	-0.243**	-0.1809**	-0.18**	-0.2479**	-0.2074**	-0.2018**	-0.1819**
partner	(3.64)	(3.49)	(2.87)	(4.48)	(3.46)	(3.59)	(5.52)	(4.07)	(3.60)	(3.35)
Divorced	-0.3574**	-0.3915**	-0.3843**	-0.3744**	-0.4196**	-0.4194**	-0.3645**	-0.4022**	-0.4008**	-0.3788**
	(6.41)	(6.90)	(6.26)	(6.70)	(6.20)	(6.55)	(7.83)	(7.64)	(7.44)	(7.58)
Widowed	-0.2684**	-0.3076**	-0.254**	-0.2208*	-0.2594**	-0.2736	-0.2439**	-0.2825**	-0.2608*	-0.2495**
	(4.53)	(5.03)	(2.87)	(2.22)	(3.11)	(1.57)	(3.52)	(4.70)	(2.37)	(4.07)
Log	0.1173**	0.2267**	0.2048**	0.0191	0.2269*	0.2167*	0.0727**	0.2357**	0.2217**	0.2737**
Education	(3.82)	(3.87)	(3.76)	(0.54)	(2.25)	(2.10)	(4.81)	(3.15)	(3.06)	(3.86)
Professional	0.0147	0.0568	0.0631	0.1143	0.1255	0.1538	0.0701	0.0914	0.1053	0.1636*
	(0.24)	(0.71)	(0.67)	(1.48)	(1.43)	(1.54)	(1.41)	(1.36)	(1.42)	(2.47)
High	0.2706**	0.1858*	0.2609**	0.2725**	0.1921	0.2702*	0.2712**	0.1808**	0.2575**	0.2688**
Management	(2.76)	(2.44)	(3.10)	(2.87)	(1.68)	(2.34)	(5.69)	(3.38)	(3.97)	(5.97)
Middle	0.0507	0.1127	0.1339	0.0992*	0.1231*	0.1336*	0.0736	0.12*	0.1359**	0.1846**
Management	(0.93)	(1.60)	(1.74)	(2.07)	(2.37)	(2.15)	(1.82)	(2.51)	(2.66)	(4.40)
Farmer	-0.2039*	-0.2247**	-0.2074*	0.021	0.1376	0.1184	-0.0754	-0.0322	-0.0313	-0.0589
	(2.36)	(2.61)	(2.20)	(0.26)	(1.22)	(0.82)	(1.66)	(0.44)	(0.39)	(0.83)
Unemployed	-0.3244**	-0.3372**	-0.3357**	-0.4035**	-0.4855**	-0.4838**	-0.3722**	-0.4186**	-0.4154**	-0.4797**
	(3.67)	(3.18)	(3.08)	(4.20)	(4.29)	(4.14)	(4.41)	(4.08)	(3.99)	(4.81)
Main earner	-0.1062	-0.1851	-0.2013	-0.264	-0.3409*	-0.3824*	-0.2154	-0.2695	-0.3014*	-0.2941*

unemployed	(0.78)	(1.29)	(1.38)	(1.61)	(2.07)	(2.19)	(1.52)	(1.84)	(1.99)	(1.99)
Relative	0.3944**	0.219*	0.2492*	0.5143**	0.2668	0.2767	0.4504**	0.2485	0.2701*	0.3114**
Income	(6.94)	(1.99)	(2.43)	(4.98)	(1.48)	(1.80)	(6.51)	(1.85)	(2.53)	(6.13)
Relative	-0.0686**	-0.0218	-0.0312	-0.0984**	-0.0315	-0.0344	-0.0817**	-0.0278	-0.0342	-0.0356*
Income^2	(3.21)	(0.47)	(0.76)	(2.78)	(0.47)	(0.57)	(3.13)	(0.52)	(0.76)	(2.09)
GDP per		2.41**	2.184**		2.166**	1.932**		2.011**	1.806**	1.958**
capita		(5.11)	(4.14)		(3.07)	(2.73)		(4.47)	(3.87)	(4.42)
GDP per		-0.3178**	-0.2848**		-0.3298**	-0.289*		-0.2672**	-0.2363**	-0.2596**
capita^2		(4.70)	(3.80)		(2.64)	(2.30)		(3.95)	(3.39)	(3.91)
2001 dummy							-0.262**	-0.5255**	-0.5274**	-0.5195**
							(5.87)	(6.98)	(6.49)	(6.92)
LL	-8516	-8863	-6619	-8165	-8612	-6490	-16797	-17572	-13191	-17534
Pseudo R^2	0.17	0.13	0.13	0.13	0.08	0.08	0.15	0.11	0.11	0.11
N	9849	9849	7421	9668	9668	7379	19517	19517	14800	19517

**/*denotes significance at the 1%/5% levels of significance respectively. (.) denotes t statistic. Equations 2.3 and 2.6 were estimated with respondents over 60 excluded from the sample. N denotes the number of observations, LL the log likelihood. Regressions, estimated in STATA, are clustered at country level to take account of intra-group correlation.

The results are shown in Table 2. They are largely consistent with other studies that estimate the determinants of happiness (see, e.g. Di Tella, MacCulloch and Oswald, 2001; Hudson, 2006; Diener et al., 2000 and Erhardt, Saris and Veenhoren, 2000). The first columns relate to 2001. Column one shows the results when including country dummy variables.[18]

Education tends to increase happiness and, in common with several other studies, women tend to be happier than men (e.g., Clark and Oswald, 1994). Happiness has a nonlinear relationship with age and is adversely affected by being unemployed or having lost a partner.[19]

The results also indicate a positive impact of increasing relative income on happiness, although there is limited evidence of significant non-linearity. This is not great and hence there is only weak evidence that redistribution policies within a country can substantially increase average happiness. In subsequent regressions this evidence becomes smaller still. This point is discussed further below. Being unemployed is also a significant cause of unhappiness, although interestingly enough this does not extend to the principal earner in the family, when that is not the respondent, being unemployed.[20]

[18] These are not reported in this table although discussed subsequently.

[19] There are diverse ways to lose a partner but the one which causes greatest distress is divorce. Thus becoming widowed for example would appear to reduce happiness by less than half the unhappiness caused by divorce. This is also the case with the separation of couples who were not legally married. This strongly suggests that it is the legal aspects of the divorce process which adds to unhappiness in addition to that caused by the loss of a partner.

[20] Others' unemployment will impact upon income which is already controlled for. Hence, this result, together with the significance of self-unemployment, suggests that there are costs, possibly psychic or health costs, to being unemployed which are unique to the individual and which are in addition to the associated lack of income.

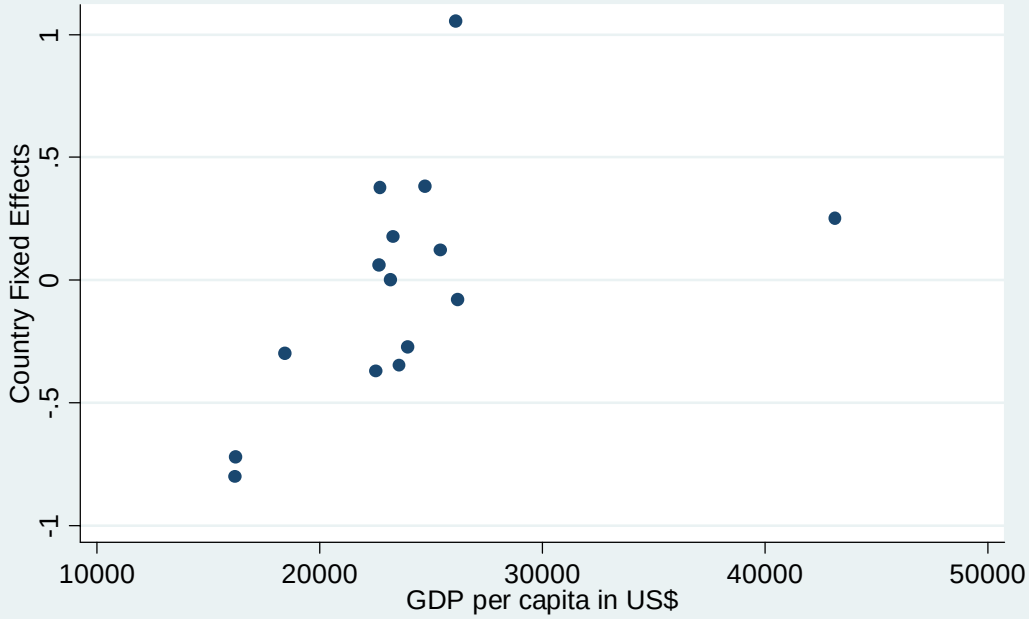
When country dummy variables are plotted against GDP per capita there appears to be a non-linear relationship as can be seen from Figure 2. Even without the two outliers, Denmark and Luxembourg, there is evidence of a nonlinear relationship confirmed by a regression with these two countries included and also excluded, on the remaining thirteen observations. In a sense the outlier is Denmark with a very large positive fixed effect. *In interpreting this it must be recalled that these country dummy variables will be picking up much more than just differences in GDP per capita.* As this is also consistent with results in other studies, this regression was repeated with GDP per capita and GDP per capita squared replacing the dummy variables[21]. The results are reported in column 2. The significance of the socio-economic variables is largely unchanged and both the GDP per capita terms are very significant at the 1% level. The signs indicate a strong nonlinearity and suggest that there are gains from policies which redistribute wealth between countries - a result in keeping with the discussion of section 2. In this regression the evidence for within country redistribution effects disappears, i.e. the coefficient on relative income squared is insignificant. The main change between this regression and the previous one is the reduced significance of relative income[22] and in particular the absence of any evidence for nonlinearity. This suggests that in the absence of country fixed effects, the distribution of relative income is reflecting some country characteristics, possibly inequality, which impact on wellbeing.

[21] They cannot be both included as the two GDP per capita variables are perfectly correlated with the country fixed effects. As a consequence, if we were to include GDP per capita and the country fixed effects in the same regressions, the latter would have to be omitted for two countries and the results vary substantially depending upon which two are omitted.

[22] This is not to say however that it is important and the variations in happiness across the relative income range are substantially more than over the age range shown in Figure 3.

Turning to data collected in November-December 1999 the results in Table 2 are similar to those already discussed. In particular, the coefficients on GDP per capita suggest that happiness increases with aggregate living standards, but at a declining rate[23]. Both sets of results include everyone aged eighteen or over and to focus more clearly on those of workable age the regressions were repeated with those over sixty excluded. These results are shown in equations 2.3 and 2.6. Again the results are largely similar. It has been suggested that the relationship between age and happiness follows a U shaped distribution, with happiness declining until some point

Figure 2 Country fixed effects and GDP per capita



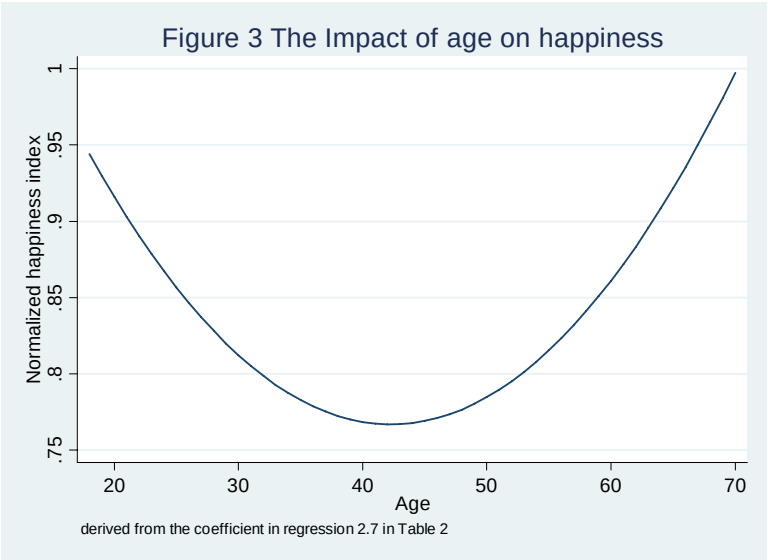
country fixed effects obtained from regression 2.7 in Table 2
and GDP per capita is the average of 2001 and 1999 corrected for PPP

in early middle age and then increasing (Blanchflower and Oswald, 2004b). To test for this, age and age squared are included. Evidence for the U-shaped pattern is strong. In the 2001 equation the trough of happiness is reached at about 36 years and

[23] Other research confirms this and it is one of the more established results in this literature that at the upper end increases in GDP per capita have little impact on happiness.

in the 1999 equation at about 48 years. These are substantial differences, although it must be emphasised that the results are not significantly different and that these estimates are sensitive to relatively small changes in the parameter estimates of the two age coefficients.

In columns 2.7-2.10 the pooled results are shown. These are largely similar to those for the separate years, although a dummy variable operative for the 2001 sample is significant at the 1% level in all three regressions and indicates that some factors not included in the regression impacted upon people to reduce their wellbeing in the more recent year. Table 3 shows the country dummy variables from the regression in column 2.7. These indicate wellbeing relative to Finland, other things being equal and ignoring GDP per capita. On this basis people living in Greece and Portugal are the unhappiest and Denmark and Sweden the happiest. Figure 3 shows the age estimated impact curve on happiness, normalised to begin at the average value for predicted happiness from this pooled regression. The critical values dividing not very satisfied and fairly satisfied and fairly satisfied and very satisfied are -0.43 and 1.55 respectively. Hence age changes are not sufficient to move this representative individual between categories, but for some individuals this would be the case.



Once more, relative income has a linear impact in the equation with GDP per capita replacing the country fixed effects, but when we use country fixed effects relative income squared is significant indicating such a nonlinearity. However, the curve is such that the nonlinearity for relative income is substantially less than that for GDP per capita and only relevant at the highest levels of relative income. Thus the regression is repeated excluding just the 500 individuals with the highest relative income. In this case the coefficient on income squared is insignificant at even the 10% level of significance[24]. Hence, it would appear that only for the very richest people in a country does the relative income impact flatten out, for the rest of the population it is nonlinear and thus, as with the regression with GDP per capita, supports this reliance on the findings discussed earlier.

[24] This is only 2.5% of the sample. There are several reasons why this might be the case. For example, following Friedman's permanent income hypothesis, those at the top of the income scale are likely to have positive transitory income, with actual income in excess of their permanent income. If it is the latter which impacts on wellbeing n relative terms, this would explain this result.

Finally, in 2.10 regression 2.8 is repeated but with relative income defined in an alternative way. There is a literature which suggests that relative income comparisons should be done with similar individuals. As a consequence, the log of income is regressed on age, age squared, gender, education, occupational status, employment status and country dummy variables. A predicted value for each income given these characteristics is obtained and a relative income measure as the ratio to this predicted variable is computed. The results in column 2.10 show this to be slightly better than the previous definition of relative income and although nonlinearities are now more strongly suggested they are still not significant in terms of the coefficient on the squared term. Although interesting in its own right, the policy implications are limited as it is difficult to envisage a general redistribution of income on the basis of socio-economic characteristic, e.g. redistributing income between women, but not from men to women.

Table 3: Country dummy variables from Regression 2.7 in Table 2

Country	*Coefficient*	*t statistic*	*Country*	*Coefficient*	*t statistic*
Belgium	-0.0791	7.88	Italy	-0.3724	29.76
Denmark	1.0540	64.38	Luxembourg	0.2520	18.17
Germany	-0.2721	22.05	Netherlands	0.3815	28.52
Greece	-0.7216	36.16	Portugal	-0.8027	30.33
Spain	-0.2992	24.12	UK	0.0603	8.82
France	-0.3476	28.12	Austria	0.1208	13.38
Ireland	0.1754	23.84	Sweden	0.3759	30.53

Note: these show differences in happiness of people in different countries relative to people living in Finland, other characteristics being equal and omitting GDP per capita.

3.3 An Index of Happiness: Policy Simulations

Equations 2.2. and 2.5 can be employed to calculate indices of happiness. From equation 2, predicted values from regressions are continuous measures of predicted happiness. They indicate how happy the i'th individual should be given their socio-economic circumstances and those of their country. The happiness (or satisfaction) of the average individual can be calibrated with reference to these characteristics.[25]

It is not a unique measure; any linear transformation of the measure is equally valid. In choosing such a transformation it is first assumed that there are lower and upper bounds on happiness of 0 and 100 respectively.[26] The lower bound of zero is found by calculating the value of Y* in the "worst case scenario", e.g. a divorced man, with an income equal to one tenth of the average with country per capita income of $10,000.

[25] This is an important point, and in part meets the criticism of those who argue that we cannot compare happiness between individuals. In calculating expected or average happiness for an individual with a set of socio-economic characteristics we allow for possible personality, or other, differences resulting in one individual being happier than another with an identical set of objective and measurable characteristics.

[26] Changing the upper bound makes no significant difference to the measure we calculate, it is the lower bound of zero which is critical. Thus for example, if we changed the upper bound to 1000, this would only have the effect of multiplying all values in the index by 10.

Similarly the upper bound is calculated by assuming a "best case scenario" of a married woman who is not unemployed, aged 60[27] and with relative income five times the average and a per capita country income equal to the optimum implied by the nonlinearity of the two regression coefficients on GDP per capita and GDP per capita squared. The worst case scenario equates to zero on the happiness index and the best case scenario to 100. This allows the calculation of a unique linear transformation of the predicted value of happiness for each individual in the sample. In the case of the 2001 data set it is:

$$H_i = 26.22 + 17.25\hat{Y}_i^* \qquad (4)$$

and for the 1999 data set:

$$H_i = 6.94 + 22.29\hat{Y}_i^* \qquad (5)$$

The difference between the two transformations is not unexpected, as the measure of $\hat{Y}_i^*$ in all cases is only unique subject to a linear transformation and is likely to differ from one data set to another. The main purpose of this transformation is to achieve a clear understanding in relative terms of average happiness and how it varies across the population. It will also facilitate a more easy evaluation of the impact of redistribution. It should not be used to compare shifts over time.

Table 4 shows the mean value of this index, for the 2001 sample, to be 66.32 and to vary from 23.91 to 93.16. The standard deviation is also shown. It is now possible to proceed with a number of simulations which estimate the impact upon happiness of

[27] 60 as people older than this are tending to cease working and hence to receive lower levels of income

different scenarios. Again these scenarios pick up the predicted change in happiness of the average individual with a given set of socio-economic characteristics. The regression analysis suggested that short term events have a considerable impact on happiness via the impact of the variables reflecting whether circumstances had changed in past years or were expected to change in the future, with the influence of the past being stronger than that of expectations of the future[28]. It is possible to find an estimate of long-run or underlying well-being by assuming that for everyone the response to these two questions is 'no-change'. The results indicate that long-run well-being is some 4.6% less than in the short run - the habituation effect.[29] This indicates that shocks to individuals are mostly positive, enhancing satisfaction rather than reducing it. This is intuitive as for a long period during their lives individuals tend to enhance their status and position as they age through promotion, moving house, marriage, etc. However, if it were possible to negate the impact of negative shocks then it can be seen that well-being would increase by the order of 1.6% to 2.9%. It could be argued that it is wrong to adopt a cardinal interpretation of the reported past and expected changes in life circumstances and that this therefore does not permit an analysis of the habituation effect. Nonetheless, we would make a similar argument to that of Di Tella et al (2001) in that these results are highly significant and at the least strongly suggest that changes in past, and to an extent future, circumstances impact on well being.

[28] This is consistent with van Praag and Frijters' (1999) conclusion that, in addition to current income, the influence of past income was stronger than that of future income on well-being.

[29] It is important to stress that the magnitude of this effect is similar to that found if the untransformed predicted values from the regression are taken. Although it is also possible that this could be due to some other characteristic that is not measured.

Table 4: Estimated Index of Happiness and Redistribution

	Mean	Std. Dev	Min	Max	Comparison with base
2001					
Basic	65.60	11.14	23.63	92.38	100.00
Long run	62.60	7.02	33.59	83.18	95.43
Country equality	65.70	10.73	25.92	90.38	100.15
EU equality	66.78	9.37	34.52	90.63	101.80
No adverse shocks	67.50	9.07	33.59	92.38	102.90
Increased education	66.33	10.76	26.33	92.38	101.11
1999					
Basic	66.28	10.50	24.89	91.06	100.00
Long run	64.43	8.82	28.31	86.90	97.20
Country equality	66.48	9.77	27.84	91.20	100.30
EU equality	67.38	8.39	30.89	87.50	101.66
No adverse shocks	67.26	9.69	29.60	91.33	101.47
Increased education	67.19	9.97	24.92	91.06	101.37

Note: These are calculated from the predicted values of equations 2.2 and 2.5 transformed using equations (4) and (5) respectively. The redistribution simulations have taken into consideration the populations of the countries and hence are feasible redistributions.

It is now possible to consider the impact of redistribution. The coefficients on GDP per capita in equations 2.2 and 2.4 provide support for the hypotheses that happiness increases with GDP per capita but at a declining rate. People in richer countries may be happier than those in poorer countries for at least two reasons. First, living in a richer country implies that, given the individual's relative income the greater will be their personal standard of living. Second, it is probable that people in richer countries enjoy a higher standard of public services and public goods (Hudson 2006). But the important point is that the impact of relative income is linear and hence as long as the redistribution from rich to poor country preserves the ranking in the former, its impact on welfare will be linked to that on GDP per capita. The nature of the coefficients suggests that people could be made happier on average by redistributing income. A result that is consonant with the analysis of section 2. The same is much less true with respect to relative income within a country. There is relatively little evidence that on average redistribution policies within countries in the EU increase average happiness.

Again a result that is consistent with section 2. This is evident from Table 4 which shows, as must be expected given the regression results, little impact on happiness of within country redistribution but that between country redistribution increases happiness by 1.8% on average in 2001 and by about 2.2% in 1999. In both cases of course the variance of happiness falls substantially. In addition, the well-being of the worst-off person in the sample increases by 46% in 1999 and 30%in 2001. The much smaller effect from introducing within country equality is a reflection of the relatively limited evidence for nonlinearity in the impact of this variable. The simulations also show the impact of increasing the education of those with the lowest level to the next level. The impact in 1999 would be to raise well-being by an estimated 3.0%, and in 2001 by 1.0%.[30] With all the reservations that have been made about the welfare connotations associated with estimates of happiness, this result offers a clear estimate (and way forward) where neo-classical welfare economics is unable to proceed.

Table 5 shows the impact of redistribution upon the constructed index of happiness across the EU countries. Between individual countries there are sharp differences amongst the winners and losers, the former of course tend to be the relatively poorer countries within the EU. Because of the nonlinearity of the impact of income on wellbeing the losses of even the richest countries are relatively smaller and this is the extreme case of redistribution, less ambitious redistribution implies smaller losses. These losses are what need to be compensated for by the impacts on welfare from (i)

[30]The fact that the estimated impact differs between the two samples would of course be expected even if the true parameter value was constant over time. However it may not be, the impact of education may depend upon the state of the world and the problems individuals have to deal with and the opportunities which are open to them. In addition, the impact can be expected to change over time as technology evolves and changes the nature of the production function between activities and happiness. For instance the impact of the growth of television may be to facilitate the happiness of the less educated, who may be less able to enjoy more traditional cultural activities, more than the better educated.

malice and envy and (ii) possible reduced time spent working in order for there to be no reduction in wellbeing for the richer countries.

Table 5: Country Impacts of EU Redistribution

	2001				*1999*		
	Before	*After*	*Change*		*Before*	*After*	*Change*
Austria	68.42	65.88	-2.54		66.21	62.87	-3.34
Belgium 70.12	66.30	-3.82		65.20	61.35	-3.85	
Denmark	72.95	69.31	-3.64		68.82	64.87	-3.95
Germany	65.31	64.74	-0.57		62.62	61.29	-1.33
Greece	51.18	64.25	+13.07		48.22	63.46	+15.2
Finland	67.44	67.35	-0.09		63.55	64.16	+0.61
France	67.61	67.38	-0.23		64.12	63.59	-0.53
Ireland	72.84	69.86	-2.98		59.03	63.41	+4.38
Italy	66.36	67.49	+1.13		61.00	62.41	+1.41
Luxembourg	73.42	70.09	-3.33		71.90	64.73	-7.17
Netherlands	71.88	70.12	-1.76		67.96	65.67	-2.29
Portugal 50.72	65.11	+14.39		47.10	62.74	+15.64	
Spain	59.75	68.08	+8.33		52.56	62.30	+9.74
Sweden 69.61	70.25	+0.64		64.04	65.31	+1.25	
UK	67.38	68.32	+0.94		62.09	63.27	+1.18

Note: These are calculated from the predicted values of equations 2.2 and 2.5 transformed using equations (4) and (5) respectively. The 'after' results are calculated by redistributing income within the EU countries so that they all have the same level of GDP per capita.

5. Conclusions

This paper set out to achieve two objectives. The first was to assess the relevance of specific empirical findings when exploring a different rationale for redistribution. The second was to consider the relevance of the same empirical findings when simulating the impact of redistribution on happiness in the EU.

The first conclusion is that specific findings reported in an empirical literature describe a world in which redistribution might increase everyone's happiness even if individuals are malevolent! The observations that both relative income and absolute income determine happiness describe a world in which redistribution from malevolent

citizens in high-income countries to individuals in low-income countries can increase the happiness of all concerned. This conclusion is possible because the happiness citizens in high-income countries derive, when seeing the income of their fellow citizens fall, more than compensates for the loss of happiness they experience when their income is taxed. If tax revenue is then distributed to citizens in the low -income country (where absolute levels of income have a bigger impact on happiness) everyone's happiness increases[31]. Empirical studies of the determinants of happiness (and results reported in this study)give substance to Brennan's (1973) paradoxical rationale for redistribution.

Of course this analysis is very specific but it has quite general implications. If tax policy can be designed to correct the market failure that is created by 'excessive' involvement in an 'acquisition race' (Frank 1997, Layard 2006), there is scope to increase everyone's happiness if revenues are redistributed to citizens in low- income countries.

Turning to the second objective in this paper it is clear that the same empirical findings have resonance when analysing the impact of redistribution on happiness. Analysis of the determinants of happiness in the EU focussed on linearity, when analysing the impact that relative income on happiness exerts as income levels increased, and non-linearity, when analysing the impact that GDP per capita exerts as income levels increase. With evidence that this relationship is relevant, it is more likely (other things equal) that redistribution from high to low income countries will increase happiness.

[31] Hence this should reduce any political problems which may surround such a program.

The simulations of redistribution in the EU are consistent with this proposition. In the reported simulation not everyone was made happier but the increase in happiness to those who gained outweighed the loss in happiness to those who lost[32]. These simulations are relevant when considering net contributions made to the EU budget. This general approach offers insight if specific financing arrangements are to be rationalised. It offers insight to policymakers if the objective is to explore the impact that alternative tax and expenditure policies of the EU budget have on happiness in member states.

The overarching conclusion (in both theoretical and empirical sections of the paper) is that analysis is sensitive to the behavioural assumptions on which it is premised. If Lord Beveridge commends policy 'to increase the happiness of the common man' there is even greater scope for government intervention. Echoing the words of the US Declaration of Independence, this paper suggests that a 'participative – protective – redistributive – educative – state' can be part of the 'pursuit of happiness'.

[32] In addition these calculations do not take account of the reduction in work effort in richer countries and the corresponding increase in happiness of individuals in these countries.

References

Beveridge Report, 1942. *Social Insurance and Allied Services*. Cmd. 6404. London: HMSO.

Bjornskov, C., Gupta, N.D. and Pedersen, P.J. 2008. Analysing trends in subjective well-being in 15 European countries, 1973 - 2002. *Journal of Happiness Studies* 9 (2): 317-330.

Blanchflower, D. G. and Oswald, A.J. 2004a. Well-being over time in Britain and the USA, *Journal of Public Economics* 88: 1359-1386.

Blanchflower, D. G. and Oswald, A.J. 2004b. Money, sex and happiness, *Scandinavian Journal of Economics* 106(3): 393-415.

Booth , P. 2007. Foreword, in H. Johns and P. Ormerod, *Happiness, Economics and Public Policy*. London; Institute of Economic Affairs, 8-12.

Boulding, K. E. 1955. *Economic Analysis,* third edition. London: Hamish Hamilton.

Brennan, G. 1973. Pareto desirable redistribution: The case of malice and envy. *Journal* of *Public Economics* 2 (2): 173-84.

Clark, A.E. and A.J. Oswald: 1994, Unhappiness and unemployment, *Economic Journal* 104, pp. 648-659.

Diener, E., C.L. Gohm, E.M. Suh and S. Oishi: 2000, Similarity of the relations between marital status and subjective well-being across cultures, *Journal of Cross Cultural Psychology* 31, pp. 419-436.

Diener, E. and Lucas, R.E. 1999. Personality and subjective well being, in D. Kahneman, E. Diener and N. Scwartz (Eds.) *Well-Being: The Foundations of Hedonic Psychology*. New York: Russell Sage Foundation, : 213-29.

Di Tella, R, MacCulloch, R.J and Oswald A. J. 2001. Preferences over inflation and unemployment: Evidence from surveys of happiness. *American Economic Review* 91 (1): 335-41.

Easterlin, R.A. 2001. Income and happiness: Towards a unified theory. *Economic Journal* 111 (473) :465-84.

Erhardt, J.J., W.E. Saris, and R. Veenhoven: 2000, Stability of life satisfaction over time, *Journal of Happiness Studies* 1, pp. 177-205.

Frank, R. H. 1997. The frame of reference as a public good. *Economic Journal* 107 (445):1832-47.

Frey, B. and Stutzer, A. 2002a. *Happiness and Economics: How the Economy and Institutions Affect Well-Being.* Princeton: Princeton University Press.

Frey, B.S. and Stutzer A. 2002b. What can economists learn from happiness research? *Journal of Economic Literature*. 40 (2) : 402-35.

Frey, B.S. and Stutzer, A. 2005. Testing theories of happiness, in Bruni, L. and Porta, P.L. (eds.) *Economics and Happiness: Framing the Analysis*. Oxford: Oxford University Press, 116-146.

Hudson, J. 2006. Institutional trust and subjective well being across the EU, *Kyklos* 59: 43-62.

Layard, R. 1980. Human satisfactions and public policy. *Economic Journal* 90 (363): 737-50.

Layard, R. 2005. Rethinking public economics; The implications of rivalry and habit, in Bruni, L. and Porta, P.L. (eds.) *Economics and Happiness: Framing the Analysis*. Oxford: Oxford University Press, 147-169.

Layard R 2006. Happiness and public policy: A challenge to the profession. *Economic Journal* 116 (March): C24-C33.

.

Rogerson, R., 2008. Structural transformation and the deterioration of European labor market outcomes. *Journal of Political Economy* 116, 235-259.

Van Praag, B.M.S. 1991. Ordinal and cardinal utility, an integration of the two dimensions of the welfare concept, *Journal of Econometrics*, 50 (1-2), 69-89.

Van Praag, B.M.S. and Frijters, P. 1999. The measurement of welfare and well-being: The Leyden approach, in D. Kahneman, E. Dinere and N. Scwartz (Eds.) *Well-Being: The Foundations of Hedonic Psychology*. New York: Russell Sage Foundation, 413-33.

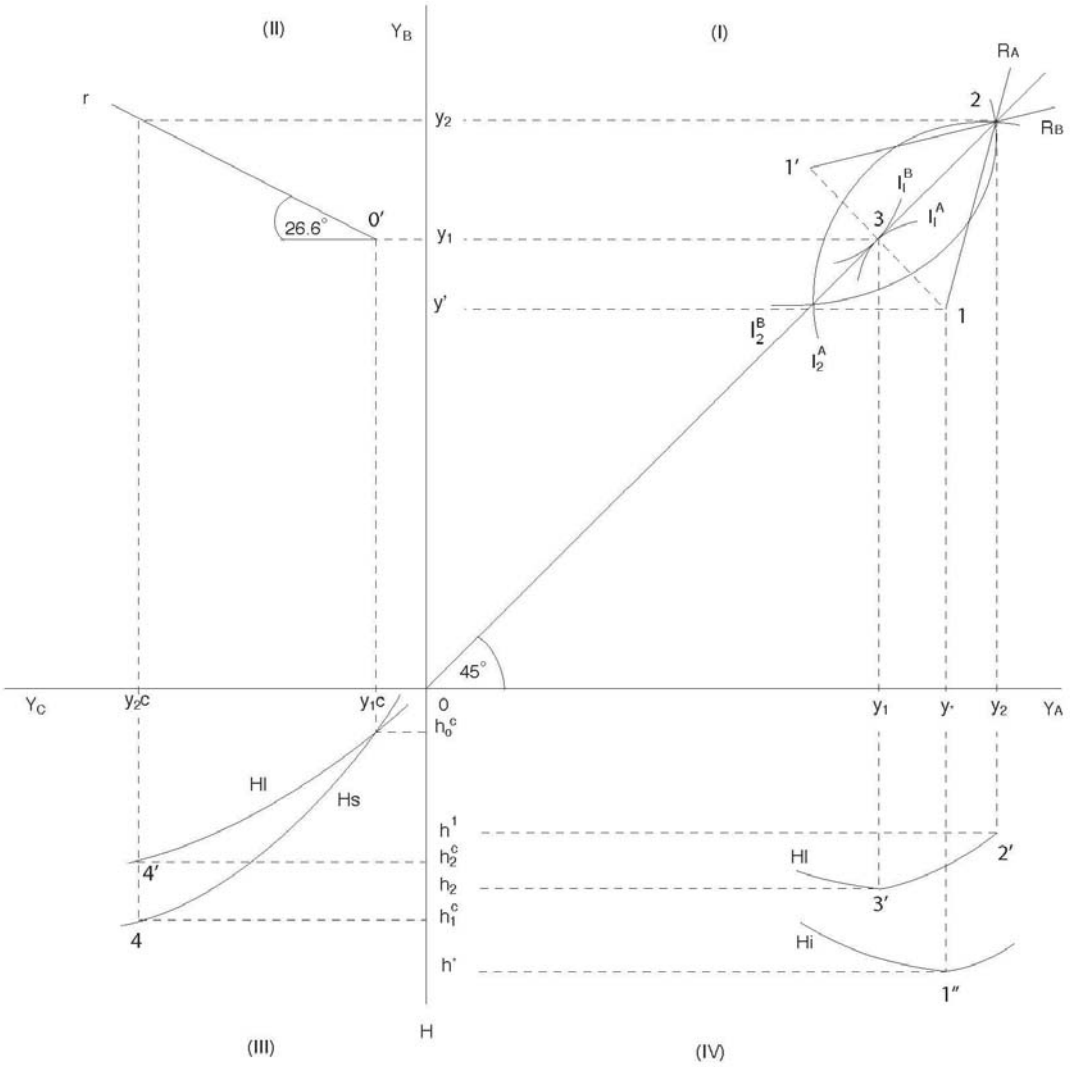


Figure 1 Redistribution and Happiness

APPENDIX: DATA DEFINITIONS

Happiness: Responses to a question which asked: "Now lets talk about the quality of life. Please tell me whether you are very satisfied (coded 4 in our analysis), fairly satisfied, not very satisfied or not at all satisfied (coded 1) with ….. your life in general?" A fifth possibility "don't know" was excluded from the regression analysis.

Gender: male=0, female=1.

Age: The age, in years, of the respondent.

Life Improved (Retrospective Changes in Happiness): For the 1999 survey: those who in comparing their current position with two years ago were: more satisfied, (3), no change (2) or less satisfied (1) with their lives in general. In the 2001 survey the time horizon was five years.

Will Improve (Expected Changes in Happiness): For the 1999 survey: as with retrospective changes in happiness but with respect to expectations covering the next two years. In the 2001 survey the time horizon was five years.

Education Age at which the individual finished full time education Coded: 1, <16 years; 2 16-19 years; 3 >19 years.

Relative income: The ratio of household income to average income in the respondent's country. The data on income is based on a fifteen point scale and to proxy income the mid point value of the range corresponding to the individual's point on the scale was taken.

Single/Single after partner/Divorced/Widowed: binary variables operative for those who were either single, single having previous lived with partner, divorced/separated or widowed. The default case is therefore those who are married or living with partner.

Farmer/Professional binary variables taking a value of one if the individual was a farmer/professional (where a professional is defined as lawyer, medical practitioner, accountant, architect, etc

High/Middle Management takes a value of 1 if the individual was a director or in top management for High Management and middle management or other management (department head, junior manager, teacher, technician) for Middle management.

Unemployed/Main Earner Unemployed binary variables taking a value of either the individual or the family's principal earner (if not the respondent) were unemployed.

GDP per capita: GDP per capita in the country where the respondent is living in the year of the Eurobarometer survey. The figures are in US$10,000 adjusted for purchasing power parity, Source: World Development Indicators.